

CLAIMS

What Is Claimed Is:

1. A continuously variable transmission comprising:
 - a carrier driven at an input rotational velocity about an axis of rotation of said carrier;
 - a plurality of planet gears mounted on said carrier and rotating about said axis of rotation of said carrier at the input rotational velocity;
 - a cam pivotable between a concentric position aligned with said axis of rotation of said carrier and an eccentric position offset from said axis of rotation of said carrier;
 - a plurality of crankshafts each driving one of said plurality of planet gears and each further operably engaging said cam, where said engagement of said cam with said crankshaft rotates its planet gear when said carrier is rotating and when said cam is in said eccentric position; and
 - a sun gear driven at an output rotational velocity where said sun gear is in an operable relationship with said planet gears, said output rotational velocity being the input rotational velocity and a highest relative rotation of said planet gears.
2. The continuously variable transmission of Claim 1 wherein the ratio of the output rotational velocity to the input rotational velocity is greater than or equal to one.
3. The continuously variable transmission of Claim 2 wherein the carrier is driven by an input shaft directly using a key and slot connection.
4. The continuously variable transmission of Claim 2 wherein the engagement of the crankshaft with the cam comprises a shoe disposed within an annulus of said cam, where said crankshaft is rotatably mounted to said shoe.
5. The continuously variable transmission of Claim 2 wherein the crankshaft is operably connected to an overrunning clutch for rotation its planet gear at the greater of the speed of the crankshaft and the velocity of the sun gear.
6. The continuously variable transmission of Claim 2 wherein said cam comprises an eccentric opening sized and shaped to clear an input shaft therein when said cam is pivoted between said concentric position and an eccentric position.

7. A transmission for converting an input rotational velocity delivered by an input shaft to an output rotational velocity imparted on an output shaft comprising:
- a carrier rotating with said input shaft at said input rotational velocity, said carrier including a plurality of planet gears engaged with a sun gear whereby a planet gear with a greatest rotational velocity drives the sun gear;
 - a variably eccentric cam connected to each of said planet gears at an annulus thereon for imparting an incremental velocity with respect to said planet gears due to an eccentricity of said cam, where said incremental velocity is not equal for all of said planet gears; and
 - means for coupling said sun gear to said output shaft.
8. A continuously variable transmission comprising:
- a drive shaft rotating with an input rotational velocity;
 - a cam bearing pivotable between a concentric position aligned with respect to an axis of rotation of said drive shaft, and an eccentric position offset from said axis of rotation, where said cam bearing rotates with said drive shaft without orbiting when occupying said concentric position and where said cam bearing rotates with said drive shaft and with orbiting when occupying an eccentric position;
 - a plurality of crankshafts spaced circumferentially about and in operable relationship with said cam bearing such that an orbiting of said cam bearing rotates said crankshaft;
 - a plurality of planet gears each disposed about one of said plurality of crankshafts and driven by said crankshaft via an overrunning clutch, where a rotation of said crankshaft results in a rotation of said planet gear; and
 - a sun gear in operable relationship with said plurality of planet gears and being driven by said planet gear with the highest rotational velocity, said sun gear communicating said highest rotational velocity to an output shaft as an output rotational velocity.
9. The continuously variable transmission of Claim 8 wherein a ratio of the output rotational velocity to the input rotational velocity is less than or equal to one.
10. The continuously variable transmission of Claim 9 wherein the drive shaft further comprises a rotary actuator for pivoting said cam bearing from said concentric position to said eccentric position.

11. The continuously variable transmission of Claim 9 further comprising a cam bearing retainer pivotally mounted on said drive shaft at a pivot pin and supporting said cam bearing thereon, where the said cam bearing retainer pivots said cam bearing from the concentric position to the eccentric position.
12. The continuously variable transmission of Claim 9 wherein said crankshafts support a shoe in contact with said cam bearing such that an orbiting of said cam bearing transmits a relative motion of said shoe, and where said motion of said shoe generates a rotation of said crankshaft.
13. The continuously variable transmission of Claim 12 wherein the crankshaft is operably connected to a one-way clutch such that a motion of said shoe as a result of said orbiting of said cam bearing rotates the crankshaft in a single direction.
14. The continuously variable transmission of Claim 13 wherein the one-way clutch is an overrunning clutch such that said planet gear can rotate faster than said crankshaft if said sun gear drives said planet gear faster than said crankshaft.
15. The continuously variable transmission of Claim 9 further comprising a counterbalance weight pivotally mounted to said drive shaft.
16. The continuously variable transmission of Claim 9 further comprising a rotary actuator mounted on said drive shaft, said rotary actuator comprising a pin guiding a position of said cam bearing retainer, said rotary actuator driving said cam bearing retainer via said pin from the concentric position to the eccentric position.